Scalp Block for Burr Holle Evacuation of Subdural Hematoma: A Series of Seven Patients and Review of the Literature

Burr Holl ile Subdural Hematom Boşaltılması için Skalp Bloğu: Yedi Hastalık Bir Seri ve Literatürün Gözden Geçirilmesi

Scalp Block

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Özet

Giriş: Skalp bloğu günümüzde yaygınlaşan kullanımı ile pek çok anestezist tarafından nöroanestezide tercih edilen peroperatif anestezi/analjezi ve postoperatif iyi bir analjezi yöntemidir. Gereç ve Yöntem: Kliniğimizde subdural hematom boşaltılması için skalp bloğu uygulanan 7 hasta sunuldu. Hastaların demografik verileri, kullanılan sedatif ajanlar ve skalp bloğu için tercih edilen lokal anestezik ajanlar ve dozları belirtildi. Tüm hastalarımız peroperatif dönemde hemodinamik stabiliteye sahipti ve komplikasyon görülmedi. Erken ve geç lokal anestezi toksisitesi hiçbir hastada görülmedi. Tartışma: Subdural hematom boşaltılması için, özelikle bu hasta popülasyonunun komorbiditeleri de göz önünde bulundurulduğunda, skalp bloğu uygulaması genel anesteziye kıyasla hem anestezistler için hem de postoperatif dönemde bu hastaları takip edecek klinisyenler için daha konforlu ve güvenlidir.

Anahtar Kelimeler

Skalp Bloğu; Subdural Hematom; Lokal Anestezikler; Nöroanestezi; Rejyonel Anestezi

Abstract

Aim: A scalp block is a good perioperative and postoperative anesthesia/analgesia method that has become widespread and preferred by many anesthesiologists. Material and Method: The present report presented seven patients, who underwent scalp block due to the evacuation of a subdural hematoma. The demographic features of the patients, sedative agents administered, and local anesthetic agents and the doses preferred for scalp block were specified. All patients were hemodynamically stable in the perioperative period, and none of the patients developed complications. None of the patients developed early or late local anesthetic toxicity. Discussion: Considering the presence of comorbid conditions in this patient population, scalp block provides a more comfortable and safe method compared to general anesthesia for both anesthesiologists and the clinicians that undertake postoperative care of the patients after evacuation of subdural hematoma.

Keywords

Scalp Block; Subdural Hematoma; Local Anesthetics; Neuroanesthesia; Regional Anesthesia

DOI: 10.4328/JCAM.2745 Received: 20.08.2014 Accepted: 13.09.2014 Printed: 01.05.2016 J Clin Anal Med 2016;7(3): 317-20
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Introduction

Historically, scalp block has been extensively used in the practice of anesthesia and neurosurgery. This method was initially preferred in patients with a high risk for general anesthesia; however, it was later introduced into the practice in order to provide hemodynamic control during general anesthesia [1], to perform functional monitoring during surgery without administering general anesthesia [2], and to provide perioperative and postoperative analgesia. The scalp block is indicated in intracranial surgeries and chronic headaches, but it is also preferred in many extracranial procedures [3].

As described by Pinosky et al. six nerves were identified by landmarks on each side of the cranium (supratrochlear, supraorbital, zygomaticotemporal, auriculotemporal, lesser occipital, and greater occipital nerves) and subsequently infiltrated with volumes of local anesthetic ranging from 2 to 5mL [1].

The aim of the present report was to present the researchers' experience on seven patients that underwent evacuation of subdural hematoma following scalp block, with an extensive review of the literature in light of the anesthesia management methods reported in the literature.

Material and Method

A total of seven patients aged between 19-86 years underwent evacuation of subdural hematoma following scalp block from June 2013 to July 2014. Of these patients, six were males and one was female and all of them were ASA III physical status. Informed consent was obtained from all patients. All patients were sedated after a successful scalp block and underwent an operation and no sedation was given to the patient before the procedure. None of the patients required endotracheal intubation or use of respiratory devices. In all patients, Richmond agitation sedation score [4] ranged from -1 to -2 during the operation. ECG, pulse oximetry, and SpO2 measurements were obtained using invasive/noninvasive arterial pressure monitorization. The oxygen was provided through a facial mask at 3 L/min with end-tidal carbon dioxide monitoring. Subdural hematoma was evacuated by creating a Burr hole. Various agents were preferred to provide intraoperative sedation, and the patients did not develop any complications and they were transferred to their original wards or intensive care units.

Results

Table I summarizes the demographics and clinical features of the patients. Four patients (Patients 1, 3, 5, and 6) were operated on due to non-traumatic subdural hematoma, and three patients (Patients 2, 4, and 7) were operated on traumatic subdural hematoma. The time of surgery ranged from 50 to 75 minutes. One of the patients (Patient 4), operated on due to traumatic subdural hematoma, also had tibia and multiple rib fractures, pneumothorax, and nasal fracture, and general condition of this patient was stable. However, the use of more sedative agents in this patient was not possible due to this lung condition, and the patient was operated on with the administration of 2 mg midazolam, which provided complete pain relief. Another patient (Patient 7), operated on due to traumatic subdural hematoma, also had nasal fracture, clavicular fracture, hemorrhage in the corpus callosum, brain edema, and this patient was monitored in the intensive care unit with a Glasgow Coma Scale (GCS) score of 11. In addition, the physical examination revealed extensive secretory rales. Dexmedetomidine sedation was preferred considering the neurological condition of the patient and in order to avoid suppression of the patient's reflexes, taking into consideration the difficulty that the patient had in expectoration. In all patients, bupivacaine and prilocaine were preferred in local anesthesia, and none of the patients had local anesthetic toxicity in the early or long term. Hypoxia, desaturation, hypo- or hypertension, or arrhythmia were not observed in any of the patients. Hemodynamic stability was achieved in all patients.

Discussion

The scalp block has increasingly become a widely-used technique in various indications. One of the most important reasons for its popularity is the hemodynamic stability in patients receiving scalp block and decreased morbidity. In cranial surgeries, incision of the scalp causes an increase in intracranial pressure [5]. There are two methods to overcome this undesired condition. One of these methods is the use of antihypertensive agents. The other method, which is the most appropriate method, is to increase the depth/extent of the anesthesia/analgesia. It is for this reason that better hemodynamic stability is achieved in patients receiving scalp block. Awake craniotomy procedure can be performed with scalp block and concurrent sedation, and awake craniotomy avoids the adverse effects that are observed with general anesthesia [6]; early postoperative neurological evaluation; speedy recovery; minimization of hospital stay [7]; and consequently, resource utilization, which is particularly beneficial in developing countries [8,9].

Infiltration anesthesia in the scalp has been previously used in cranial surgeries [10-15], and selective nerve blockade was first described by Girvin et al. [16] in 1986 and then by Rubial et al. [17] in 1992. However, he scalp block method currently used in our practice was first described by Pinosky et al. in 1996. Pinosky et al. compared saline and 0.5% bupivacaine infiltration to induce a block in supraorbital, supratrochlear, great auricular, auriculotemporal, and greater and lesser occipital nerves, and they reported a remarkable difference between these two groups [1].

In a study of ten high risk patients, due to airway management or comorbidities [18], scalp block and dexmedetomidine sedation were used for awake craniotomy, and none of the airway management devices were used in any of these patients. Similar to this report, Patient 7 in the current study was operated on with scalp block and concurrent dexmedetomidine sedation, and none of the airway management devices were employed. In another series of patients, dexmedetomidine and remifentanil sedation was used in addition to scalp block. In this study, however, the incision line was also infiltrated with 10-15 ml of 2% lignocaine solution. In two reports of awake craniotomy in the literature that reported two children, aged 9 and 16 years, propofol was preferred to provide sedation [19,20]. However, scalp block was used in just one of these patients [20], and local anesthetic infiltration was preferred in the other patient [19].

The scalp block can be combined not only with awake craniotomy, but also with general anesthesia. Scalp block has been

Table I . Demographics and clinical features of the patients

Patient	Age	Sex	Height-weight BMI	Diagnosis	Surgery time (min)	Comorbidities	Localization-subduralhematoma	LocalAnesthecticUsed-forscalpblock	Theagent-susedforsedation	AbnormalLaboratoryFindings	Intraoperative-complications (hypotension, desaturation, arrhythmia, etc.)
1	75	M	168 75 26.6	Non-traumaticsubduralhematoma	60	Smoker	Leftfrontoparietal	Bupivacaine % 0.5 (5 ml) + Prilocaine % 2 (7.5 ml)	Propofol 100 mg + remifentanyl 0.1mcg/kg/min	Na: 132 mEq/L	ø
2	19	M	172 81 27.4	Traumaticsubduralhematoma	75	ø	Leftfrontoparietal	Bupivacaine % 0.5 (8 ml) + Prilocaine % 2 (8 ml)	Midazolam 2 mg + fentanyl 100 mcg	ø	ø
3	86	M	171 68 23.3	Non-traumaticsubduralhematoma	70	Hypertension-Hypothyroidism	Leftfrontoparietal	Bupivacaine % 0.5 (7 ml) + Prilocaine % 2 (7 ml)	Midazolam 2 mg + Propofol 50 mg + fentanyl 100 mcg	ø	ø
4	59	M	170 85 29.4	Traumaticsubduralhematoma	75	Smoker, Tibialshaftfracture Multipleribfractures Pneumothorax Nasalfracture	Bilateralfrontal	Bupivacaine % 0.5 (7 ml) + Prilocaine % 2 (7 ml)	Midazolam 2 mg	K:3.3 mEq/L Hgb: 9 gr/dL	ø
5	56	M	181 85 25.9	Non-traumaticsubduralhematoma	75	Smoker Diabetesmellitus Hypertension Chronicrenalfailure	Right Frontoparietotemporal	Bupivacaine % 0.5 (10 ml) + Prilocaine % 2 (5 ml)	Propofol 10 mg+ fentanyl 50 mcg	K:3.3 mEq/L Hgb: 9 gr/dL Urea:56 mg/dl Creatinine:5.5 mg/dl	ø
6	55	F	165 65 24.6	Non-traumaticsubduralhematoma	65	Diabetesmellitus	LeftTemeroparietal	Bupivacaine % 0.5 (8 ml) + Prilocaine % 2 (5 ml)	Midazolam 1 mg + Propofol 20 mg	ø	ø
7	44	M	175 75 24.5	Traumaticsubduralhematoma	50	Smoker Nasalfracture Thecorpuscallosumhemorrhage Clavicularfracture Brain edema	Right frontoparietal	Bupivacaine % 0.5 (10 ml) +Prilocaine % 2 (10 ml)	Midazolam 1 mg + dexmedetomidine0.4 mg/kg/h	AST: 64 U/L ALT: 119 U/L	ø

shown to reduce the incidence and severity of postoperative pain in these patients [21,22] and provide hemodynamic stability during skin incision and opening of the dura mater [23]. The median pain score at the postoperative sixth hour was shown to be significantly lower after bupivacaine application. In a recent randomized, controlled and double-blind study that compared morphine administration and scalp block, similar efficiency has been reported for both methods; however, morphine administration was associated with higher incidence of nausea and vomiting [24].

Despite the advantages that have been reported so far [6-9], the use of local anesthetics in these procedures produces the risk of all complications related to local anesthetic agents. Chawdhury et al. reported severe bradycardia during scalp block, and they reported trigeminal cardiac reflex as being the cause of this finding. In addition, patient series have reported undesired fascial nerve block at a rate of 8.6% as being the complication of the auriculotemporal nerve block, which is the component of the scalp block [25]. In order to avoid this complication, Bebawy et al. recommended an alternative method involving the introduction of the needle 1 cm superior to the level of the tragus and posterior to the superficial temporal artery and decreasing the volume of local anesthetic agent to 3 ml [26]. In the present patient, the needle was introduced 1.5 cm anterior to thetragus while immobilizing superficial temporal artery by hand, and 5 ml of local anesthetic solution was infiltrated. The patient in the current study did not develop fascial nerve block using this technique; however, the researchers consider that the alternative method reported by Bebawy et al. can also be used in such high risk patients.

In view of the future of scalp block, the use of US guidance can be anticipated with widespread use of ultrasound (US) in the practice of peripheral and selective nerve blockade. Although some components of this block are performed under US guidance [27-29], use of US has not become a routine practice in scalp block. The researchers of the current study consider that scalp block will be a safer procedure with the use of US guidance in near future.

In conclusion, scalp block, which, in retrospect, evolved from infiltration anesthesia and then proceeded with selective nerve blockade, will apparently become a more common procedure considering its many perioperative and postoperative benefits. Although a wide range of sedative agents can be selected as an adjuvant to scalp block considering the medical conditions of the patients, hemodynamic stability can be easily achieved with scalp block coupled with good anesthesia management.

Furthermore, the authors consider that US can find a place in the practice of scalp block.

Competing interests

The authors declare that they have no competing interests.

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How to cite this article:
Sargın M, Uluer MS, Cebeci Z, Özmen S. Scalp Block for Burr Holle Evacuation of Subdural Hematoma: A Series of Seven Patients and Review of the Literature. J Clin Anal Med 2016;7(3): 317-20.